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NEC Express5800/R120e-2M System Configuration Guide

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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NEC Corporation

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Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v2 product family
- Up to 1.5 TB of high speed DDR3 memory
- High energy efficiency with power capping feature and 80 PLUS® Platinum power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

Specification

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Model		R120e-2M			
Part Number		N8100-2072F			
Processor	**Type**	Intel® Xeon® processor E5-2609 V2	Intel® Xeon® processor E5-2620 v2	Intel® Xeon® processor E5-2630 v2	Intel® Xeon® processor E5-2630L v2
	Clock speed	2.50 GHz	2.10 GHz	2.60 GHz	2.40 GHz
	Number of Processors	1 to 2			
	Cache	10 MB	15 MB		
	Cores and Threads	4C-4T	6C-12T		
Chipset		Intel® C602-J Chipset			
Memory	**Type**	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 ECC Registered Low Power DIMM, DDR3-1600 ECC Load Reduced DIMM DDR3-1333 ECC Load Reduced DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	1.5 TB (24 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD : 19.2 TB (16 x 1.2 TB) SATA HDD : 16 TB (16 x 1 TB) SAS SSD : 6.4 TB (16 x 400 GB)			
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16 [1]			
Expansion Slots	**Standard**	Total: 7 slots available 2 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) dedicated LAN slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			

Model		R120e-2M			
Expansion Slots (Cont.)	**Optional Riser Card (N8116-25)**	Total: 6 slots available 1 PCIe 3.0 x16 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-26)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 64-bit/ 133 MHz PCI-X 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-27)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) [2] 2 PCIe 3.0 x4 (x8 connector) 2 64-bit / 33 MHz 5V PCI 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M [3]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 450 Watt or 800 Watt or 1000 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	360 VA / 358 Watt	364 VA / 361 Watt	367 VA / 365 Watt	356 VA / 354 Watt
	(Max. Config, Operating)	631 VA / 627 Watt	670 VA / 665 Watt	751 VA / 746 Watt	691 VA / 686 Watt
Acoustical Noise (Sound Pressure Level) [4]	**Max. Config, Idling**	53.6dB			53.6dB
	Max. Config, Operating	56.3dB			55.6dB
Dimensions (W x D x H)		448.0 x 735.8 [5] x 87.2 mm / 17.6 x 28.9 [5] x 3.4 in (2U)			
Weight (Minimum / Maximum)		20.5 kg / 33 kg, 45.19 lbs. / 72.75 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, RCM, CE, UL, CB, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Red Hat Enterprise Linux 6.4 or later (x86) [6] Red Hat Enterprise Linux 6.4 or later (x86_64) [6] VMware ESX™i 5.0 Update 2 VMware ESX™i 5.1 Update 1			

1 An optional drive cage is required to install more than 8 hard drives.

2 Available only when the second processor is configured.

3 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

[4] Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

[5] When mounting 1000 Watt power supply, the depth is 770 mm (30.31 in).

[6] For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

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Model		R120e-2M			
Part Number		N8100-2072F			
Processor	**Type**	Intel® Xeon® processor E5-2637 v2	Intel® Xeon® processor E5-2640 v2	Intel® Xeon® processor E5-2650 v2	Intel® Xeon® processor E5-2660 v2
	Clock speed	3.50 GHz	2 GHz	2.60 GHz	2.20 GHz
	Number of Processors	1 to 2			
	Cache	15 MB	20 MB		25MB
	Cores and Threads	4C-8T	8C-16T		10C-20T
Chipset		Intel® C602-J Chipset			
Memory	**Type**	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 ECC Registered Low Power DIMM, DDR3-1866 ECC Registered DIMM [1], DDR3-1600 ECC Load Reduced DIMM DDR3-1333 ECC Load Reduced DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	1.5 TB (24 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD : 19.2 TB (16 x 1.2 TB) SATA HDD : 16 TB (16 x 1 TB) SAS SSD : 6.4 TB (16 x 400 GB)			
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16 [2]			
Expansion Slots	**Standard**	Total: 7 slots available 2 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [3] 1 PCIe 3.0 x8 (x8 connector) dedicated LAN slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-25)	Total: 6 slots available 1 PCIe 3.0 x16 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [3] 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			

Model		R120e-2M			
Expansion Slots (Cont.)	Optional Riser Card (N8116-26)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [3] 1 64-bit/ 133 MHz PCI-X 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-27)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) [3] 2 PCIe 3.0 x4 (x8 connector) 2 64-bit / 33 MHz 5V PCI 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M [4]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 450 Watt or 800 Watt or 1000 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	(Max. Config, Idling)	367 VA / 364 Watt	375 VA / 372 Watt	369 VA / 367 Watt	372 VA / 369 Watt
	(Max. Config, Operating)	754 VA / 749 Watt	751 VA / 745 Watt	795 VA / 790 Watt	789 VA / 783 Watt
Acoustical Noise (Sound Pressure Level) [5]	Max. Config, Idling	53.6dB	53.6dB		
	Max. Config, Operating	59.6dB	56.3dB		
Dimensions (W x D x H)		448.0 x 735.8 [6] x 87.2 mm / 17.6 x 28.9 [6] x 3.4 in (2U)			
Weight (Minimum / Maximum)		20.5 kg / 33 kg, 45.19 lbs. / 72.75 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C [7] / 50° to 104° F [7], 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, RCM, CE, UL, CB, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Red Hat Enterprise Linux 6.4 or later (x86) [8] Red Hat Enterprise Linux 6.4 or later (x86_64) [8] VMware ESX™i 5.0 Update 2 VMware ESX™i 5.1 Update 1			

1 Not supported on Xeon® processor E5-2637 v2 systems

2 An optional drive cage is required to install more than 8 hard drives.

3 Available only when the second processor is configured.

4 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

5 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

6 When mounting 1000 Watt power supply, the depth is 770 mm (30.31 in).

7 Operable up to 35°C (95°F) when Xeon processor E5-2637 v2 is configured with an added optional drive cage.

[8] For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

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Model		R120e-2M			
Part Number		N8100-2072F			
Processor	**Type**	Intel® Xeon® processor E5-2670 v2	Intel® Xeon® processor E5-2690 v2	Intel® Xeon® processor E5-2695 v2	Intel® Xeon® processor E5-2697 v2
	Clock speed	2.50 GHz	3 GHz	2.40 GHz	2.70 GHz
	Number of Processors	1 to 2			
	Cache	25 MB		30 MB	
	Cores and Threads	10C-20T		12C-24T	
Chipset		Intel® C602-J Chipset			
Memory	**Type**	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 ECC Registered Low Power DIMM, DDR3-1866 ECC Registered DIMM, DDR3-1600 ECC Load Reduced DIMM DDR3-1333 ECC Load Reduced DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	1.5 TB (24 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD : 19.2 TB (16 x 1.2 TB) SATA HDD : 16 TB (16 x 1 TB) SAS SSD : 6.4 TB (16 x 400 GB)			
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16 [1]			
Expansion Slots	**Standard**	Total: 7 slots available 2 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) dedicated LAN slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-25)	Total: 6 slots available 1 PCIe 3.0 x16 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-26)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 64-bit/ 133 MHz PCI-X 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			

Model		R120e-2M			
Expansion Slots (Cont.)	Optional Riser Card (N8116-27)	Total: 7 slots available 1 PCIe 3.0 x8 (x16 connector) [2] 2 PCIe 3.0 x4 (x8 connector) 2 64-bit / 33 MHz 5V PCI 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M [3]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 450 Watt or 800 Watt or 1000 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	(Max. Config, Idling)	365 VA / 362 Watt	363 VA / 360 Watt	378 VA / 375 Watt	381 VA / 378 Watt
	(Max. Config, Operating)	819 VA / 813 Watt	934 VA / 928 Watt	895 VA / 889 Watt	944 VA / 937 Watt
Acoustical Noise (Sound Pressure Level) [4]	Max. Config, Idling	53.6dB	53.6dB	53.6dB	53.6dB
	Max. Config, Operating	56.3dB	59.6dB	56.3dB	59.6dB
Dimensions (W x D x H)		448.0 x 735.8 [5] x 87.2 mm / 17.6 x 28.9 [5] x 3.4 in (2U)			
Weight (Minimum / Maximum)		20.5 kg / 33 kg, 45.19 lbs. / 72.75 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, RCM, CE, UL, CB, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Red Hat Enterprise Linux 6.4 or later (x86) [7] Red Hat Enterprise Linux 6.4 or later (x86_64) [7] VMware ESX™i 5.0 Update 2 VMware ESX™i 5.1 Update 1			

1 An optional drive cage is required to install more than 8 hard drives.

2 Available only when the second processor is configured.

3 Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

4 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

5 When mounting 1000 Watt power supply, the depth is 770 mm (30.31 in).

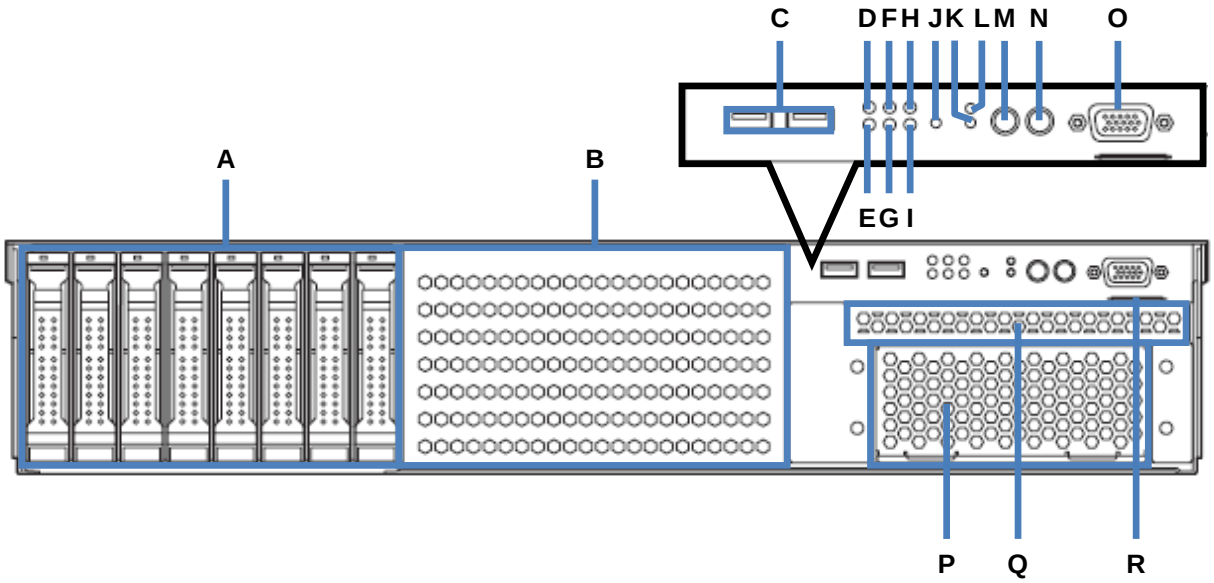
6 Operable up to 35°C (95°F) when Xeon processor E5-2690 v2 or E5-2697 v2 is configured with an added optional drive cage.

7 For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

External Views

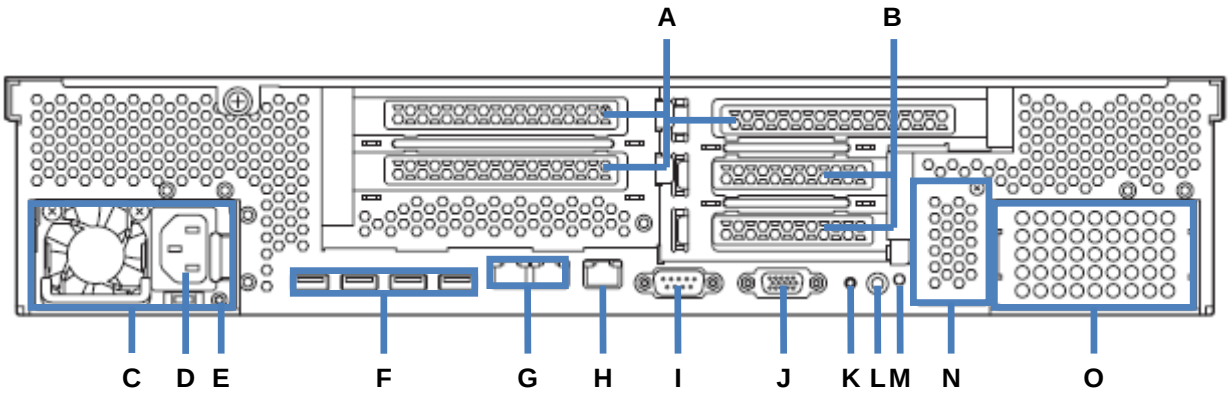
Front and Rear Views

Front View



Legend			
A.	2.5-inch Drive Bays	**J.**	BMC Reset Button
B.	2.5-inch Drive Cage Bay	**K.**	Dump (NMI) Button
C.	USB Connectors	**L.**	System Reset Button
D.	Data LAN 1 Activity LED	**M.**	UID LED Button
E.	Data LAN 2 Activity LED	**N.**	Power Button / Power LED
F.	Data LAN 3 Activity LED	**O.**	VGA Connector
G.	Data LAN 4 Activity LED	**P.**	Media Bay
H.	Hard Drive Activity LED	**Q.**	Optical Drive Bay
I.	System Status LED	**R.**	Pull-out Tab

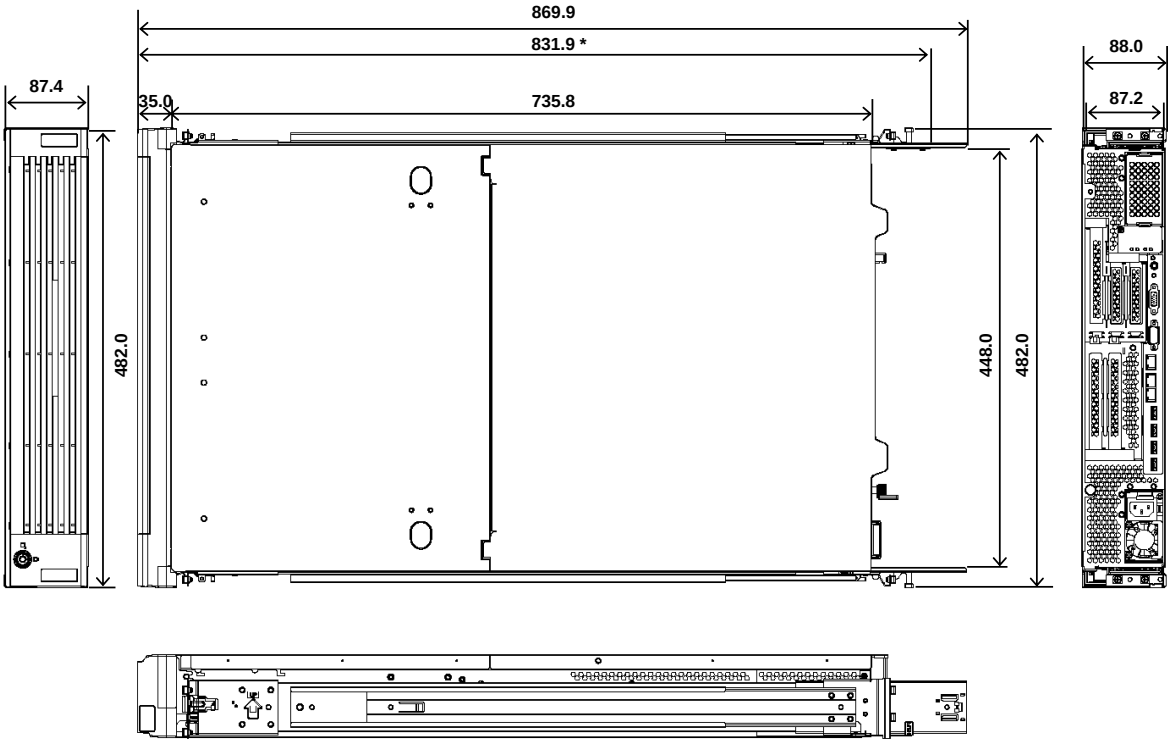
Rear View



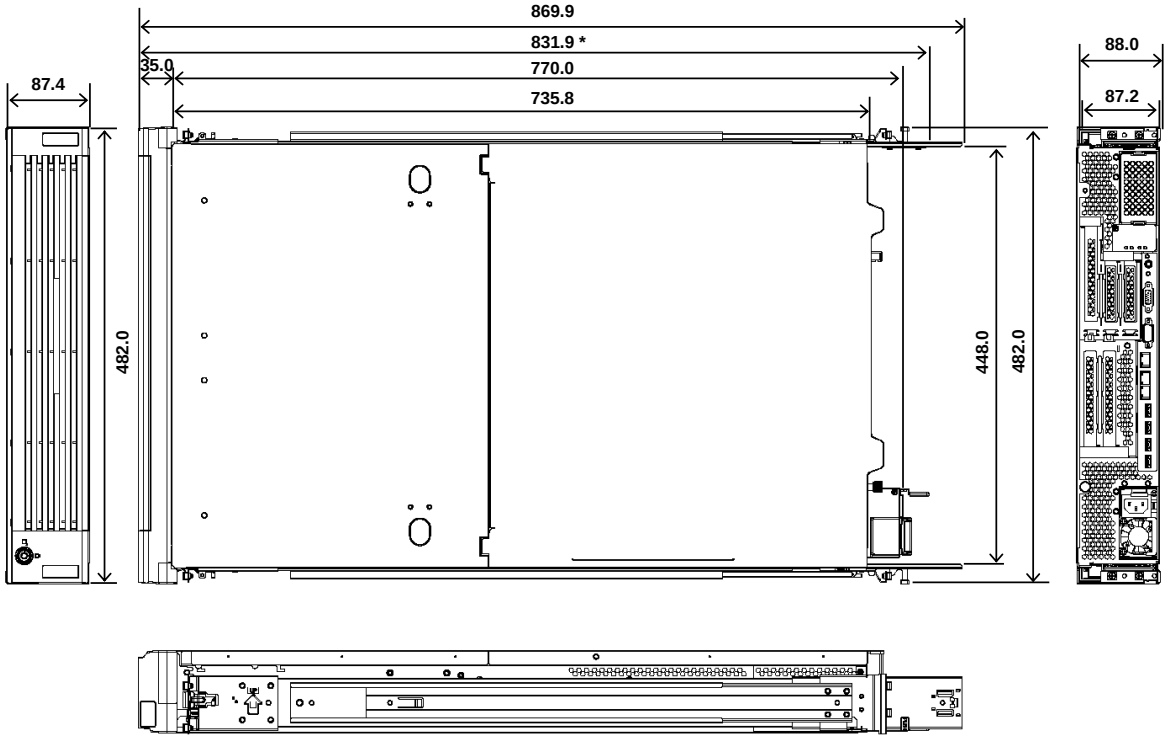
Legend			
A.	PCI Slots (Full-Height)	**I.**	Serial Port Connector
B.	PCI Slots (Low-Profile)	**J.**	VGA Connector
C.	Power Supply	**K.**	Dump (NMI) Switch
D.	AC Inlet	**L.**	UID Button/LED
E.	AC Power LED	**M.**	DC Power LED
F.	USB Connectors	**N.**	PCI Slot (LAN Riser)
G.	Data LAN Connectors	**O.**	Additional Power Supply Slot
H.	Management LAN Connector		

Dimensions (mm)

450 Watt or 800 Watt Power Supply Configuration

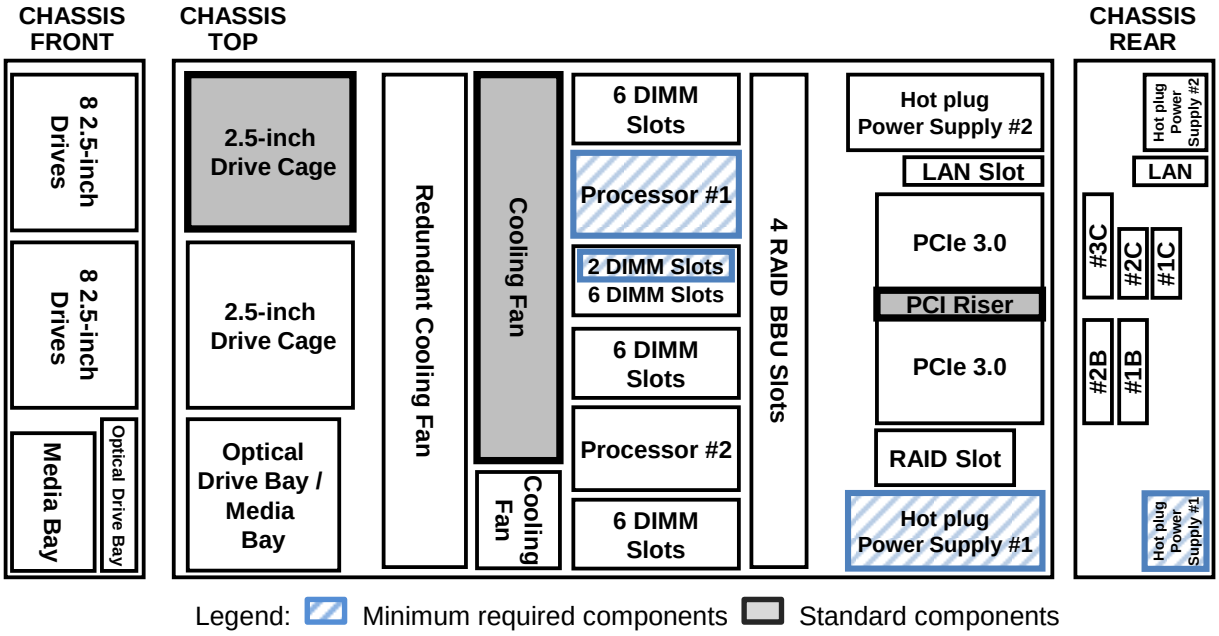


1000 Watt Power Supply Configuration

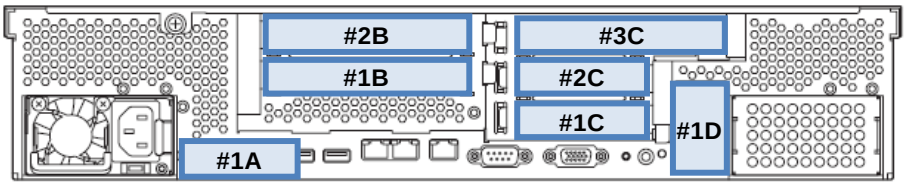


* Wthout back side parts of slide rails (in that case, cable arm cannot be attached)

Configuration Diagram



Expansion Slots



Legend		
Common	**#1A**	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller
	#1C	PCIe 3.0 x4, x8 connector, Low-profile, up to 220 mm length
	#2C	PCIe 3.0 x4, x8 connector, Low-profile, up to 220 mm length
	#3C	PCIe 3.0 x8, x16 connector, Full-height, up 220 mm length
	#1D	PCIe 3.0 x8, x8 connector, for a flexible integrated NIC (LAN Riser)
PCIe Riser Card Kit	**#1B**	PCIe 3.0 x8, x16 connector, Full-height, up to 220 mm length
	#2B	PCIe 3.0 x8, x16 connector, Full-height, up to 312 mm length
PCIe x16 Riser Card Kit	**#1B**	PCIe 3.0 x16, x16 connector, Full-height, up to 220 mm length
	#2B	Not available
PCI-X Riser Card Kit	**#1B**	PCIe 3.0 x8, x16 connector, Full-height, up to 220 mm length
	#2B	64bit / 133 MHz / 3.3V PCI-X, Full-height, up to 312 mm length
PCI Riser Card Kit	**#1B**	64bit / 33 MHz / 5V PCI, Full-height, up to 220 mm length
	#2B	64bit / 33 MHz / 5V PCI, Full-height, up to 312 mm length

NOTE:

- Up to 312 mm length card can be installed into slot #1B when N8116-28 Full Length PCI Card installation Kit is installed.
- The slot #3C is available in dual processor configuration.

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120e-2M Server no processor, no RAM, no HDD, no ODD, no PSU, no front bezel Including: 2.5-inch Drive Cage, EXPRESSBUILDER DVD	N8100-2072F

NOTE:

- The base model must be ordered with a processor kit.

2 Processors and Heat Sink

Available sockets: 2

Product Name / Description			Part Number
Processors **1 Processor Required**		**Xeon E5-2609 v2 Processor Kit** Intel® Xeon ® Processor E5-2609 v2 (2.50 GHz, 4C/4T, 10 MB)	N8101-675F
		Xeon E5-2620 v2 Processor Kit Intel® Xeon ® Processor E5-2620 v2 (2.10 GHz, 6C/12T, 15 MB)	N8101-676F
		Xeon E5-2630 v2 Processor Kit Intel® Xeon ® Processor E5-2630 v2 (2.60 GHz, 6C/12T, 15 MB)	N8101-677F
		Xeon E5-2630L v2 Processor Kit Intel® Xeon ® Processor E5-2630L v2 (2.40 GHz, 6C/12T, 15 MB)	N8101-678F
		Xeon E5-2637 v2 Processor Kit Intel® Xeon ® Processor E5-2637 v2 (3.50 GHz, 4C/8T, 15 MB)	N8101-679F
		Xeon E5-2640 v2 Processor Kit Intel® Xeon ® Processor E5-2640 v2 (2 GHz, 8C/16T, 20 MB)	N8101-680F
		Xeon E5-2650 v2 Processor Kit Intel® Xeon ® Processor E5-2650 v2 (2.60 GHz, 8C/16T, 20 MB)	N8101-681F
		Xeon E5-2660 v2 Processor Kit Intel® Xeon ® Processor E5-2660 v2 (2.20 GHz, 10C/20T, 25 MB)	N8101-682F
		Xeon E5-2670 v2 Processor Kit Intel® Xeon ® Processor E5-2670 v2 (2.50 GHz, 10C/20T, 25 MB)	N8101-683F
		Xeon E5-2690 v2 Processor Kit Intel® Xeon ® Processor E5-2690 v2 (3 GHz, 10C/20T, 25 MB)	N8101-684F
		Xeon E5-2695 v2 Processor Kit Intel® Xeon ® Processor E5-2695 v2 (2.40 GHz, 12C/24T, 30 MB)	N8101-686F
		Xeon E5-2697 v2 Processor Kit Intel® Xeon ® Processor E5-2697 v2 (2.70 GHz, 12C/24T, 30 MB)	N8101-685F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor, including cooling fan kit	N8101-691F

NOTE:

- Minimum one processor kit from above must be installed.
- The processors must be the same to configure dual processor system.

The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

Number of Logical Processors Supported by Operating Systems		Maximum Available Number of Logical Processors
Microsoft Windows Server 2008 Standard Microsoft Windows Server 2008 Enterprise	**32**	**32**
Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 Enterprise (x64)	**64**	**48**
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**256** [1]	**48**
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	**640** [1]	**48**
Red Hat Enterprise Linux 6	**32**	**32**
Red Hat Enterprise Linux 6 (x86_64)	**160**	**48**
VMware ESXi 5.0 / 5.1	**160**	**48**

[1] The maximum numbers of logical processors and virtual processors when using Hyper-V are below
- Windows Server 2008 : 24 logical processors, 4 virtual processors per virtual machine
- Windows Server 2008 R2 : 64 logical processors, 4 virtual processors per virtual machine
- Windows Server 2012 : 24 logical processors, 4 virtual processors per virtual machine

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your operating system and memory configuration:

Other OS than Windows Server 2008 Standard

- Independent Channel: Refer to **3.2.1**
- Memory Sparing Configuration: Refer to **3.2.2**
- Memory Mirroring / Memory Lockstep Configuration: Refer to **3.2.3**

Windows Server 2008 Standard

- Independent Channel: Refer to **3.3.1**
- Memory Mirroring: Refer to **3.3.2**

3.2 Other OS than Windows Server 2008 Standard

3.2.1 Independent Channel Configuration

Available slots: 12 per processor

Category		Product Name / Description	Part Number
Unbuffered DIMM (UDIMM)		**8GB DDR3-1600 UNB Memory Kit** 2 x 4GB Unbuffered ECC DIMM, DDR3L-1600(PC3L-12800) **NOTE:** - Up to four sets (eight slots) per processor can be installed - This DIMM does not support x4 SDDC.	N8102-534F
Registered DIMM (RDIMM)	**1600 MHz**	**8GB DDR3-1600 REG Memory Kit** 2 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-537F
		16GB DDR3-1600 REG Memory Kit 2 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-538F
		32GB DDR3-1600 REG Memory Kit 2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-539F
	1866 MHz	**16GB DDR3-1866 REG Memory Kit** 2 x 8GB Registered ECC DIMM, DDR3-1866(PC3-14900) **NOTE:** - Up to two sets (four slots) per processor can be installed - Memory voltage is set to 1.5V automatically - Not supported with the following processors: E5-2609 v2, E5-2620 v2, E5-2630 v2, E5-2630L v2, and E5-2640 v2	N8102-545F
		32GB DDR3-1866 REG Memory Kit 2 x 16GB Registered ECC DIMM, DDR3-1866(PC3-14900) **NOTE:** - Up to two sets (four slots) per processor can be installed - Memory voltage is set to 1.5V automatically - Not supported with the following processors: E5-2609 v2, E5-2620 v2, E5-2630 v2, E5-2630L v2, and E5-2640 v2	N8102-546F
Load Reduced DIMM (LRDIMM)		**64GB DDR3-1600 LR Memory Kit** 2 x 32GB Load Reduced ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-540F
		128GB DDR3-1333 LR Memory Kit 2 x 64GB Load Reduced ECC DIMM, DDR3L-1333(PC3L-10600)	N8102-541F

NOTE:

- Minimum one memory kit per processor must be installed.

- It is recommended to install memory kits in multiples of two (four identical DIMMs) for quad-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of UDIMM/RDIMM(1600MHz)/RDIMM(1866MHz)/LRDIMM are not supported.

3.2.2 Memory Sparing Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
12GB DDR3-1600 REG Memory Kit 3 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-552
24GB DDR3-1600 REG Memory Kit 3 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-553
48GB DDR3-1600 REG Memory Kit 3 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-554

NOTE:

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.
- When two processors are installed, balance the DIMMs across the two processors.
- The logical memory capacity at the time of memory sparing becomes two-thirds of physical capacity with configurations less than 8GB DIMM and five-sixth physical capacity with configurations more than 16GB DIMM.

3.2.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
8GB DDR3-1600 REG Memory Kit 2 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-548
16GB DDR3-1600 REG Memory Kit 2 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-549
32GB DDR3-1600 REG Memory Kit 2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-550

NOTE:

- Minimum one memory kit per processor must be installed.

3.3 Windows Server 2008 Standard

3.3.1 Independent Channel Configuration

Available slots: 1

Product Name / Description	Part Number
4GB DDR3-1600 REG Memory Kit 1 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-582

NOTE:

- Only one Memory Kit can be installed regardless of the number of processors.

3.3.2 Memory Mirroring Configuration

Available slots: 2

Product Name / Description	Part Number
8GB DDR3-1600 REG Memory Kit 2 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-548

NOTE:

- Only one Memory Kit (two DIMMs) can be installed regardless of the number of processors.

Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	2/3 physical memory (2, 4GB DIMM) 5/6 physical memory (8, 16GB DIMM)	Full physical memory	Half physical memory
Available Memory Channels	4	4	4	4
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR3 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	# of DIMMs per processor	Memory Power Setting	DIMM Speed
E5-2609 v2	UDIMM: 4GB	-	-	1333 MHz
	1600 RDIMM: 4, 8, 16 GB	Up to 8 DIMMs	-	1333 MHz
		10 or more DIMMs	Low (1.35V)	800 MHz
			Normal (1.5V)	1066 MHz
	LRDIMM: 32GB	Up to 8 DIMMs	-	1333 MHz
		10 or more DIMMs	-	1066 MHz
	LRDIMM: 64GB	-	-	1066 MHz
	For Memory Sparing	-	Low (1.35V)	800 MHz
		-	Normal (1.5V)	1066 MHz
E5-2620 v2 E5-2630 v2	UDIMM: 4GB	-	Low (1.35V)	1333 MHz
			Normal (1.5V)	1600 MHz
E5-2630L v2 E5-2640 v2	1600 RDIMM: 4, 8, 16 GB	Up to 8 DIMMs	Low (1.35V)	1333 MHz
			Normal (1.5V)	1600 MHz
		10 or more DIMMs	Low (1.35V)	800 MHz
			Normal (1.5V)	1066 MHz
	LRDIMM: 32GB	Up to 8 DIMMs	-	1600 MHz
		10 or more DIMMs	-	1066 MHz
	LRDIMM: 64GB	-	-	1066 MHz
	For Memory Sparing	-	Low (1.35V)	800 MHz
		-	Normal (1.5V)	1066 MHz
E5-2637 v2 E5-2650 v2	UDIMM: 4GB	-	Low (1.35V)	1333 MHz
			Normal (1.5V)	1600 MHz
E5-2660 v2 E5-2670 v2 E5-2690 v2 E5-2695 v2	1600 RDIMM: 4, 8, 16 GB	Up to 8 DIMMs	Low (1.35V)	1333 MHz
			Normal (1.5V)	1600 MHz
		10 or more DIMMs	Low (1.35V)	800 MHz
			Normal (1.5V)	1066 MHz
E5-2697 v2	1866 RDIMM: 8, 16 GB	-	Normal (1.5V)	1866MHz
	LRDIMM: 32GB	Up to 8 DIMMs	-	1600 MHz
		10 or more DIMMs	-	1066 MHz
	LRDIMM: 64GB	-	-	1066 MHz
	For Memory Sparing	-	Low (1.35V)	800 MHz
		-	Normal (1.5V)	1066 MHz

NOTE:

- Memory voltage is set to 1.5V automatically when installing DDR-1866 RDIMMs.

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by Operating Systems		Maximum Available Memory
Microsoft Windows Server 2008 Standard	**4 GB**	**4 GB (HW-DEP enabled)** **App. 2 GB(HW-DEP disabled)**
Microsoft Windows Server 2008 Standard (x64) [1] Microsoft Windows Server 2008 R2 Standard [1]	**32 GB**	**32 GB**
Microsoft Windows Server 2008 Enterprise	**64 GB**	**64 GB**
Microsoft Windows Server 2008 Enterprise (x64) [1]	**1 TB**	**1 TB**
Microsoft Windows Server 2008 R2 Enterprise [1]	**2 TB**	**1.5 TB**
Microsoft Windows Server 2012 Standard [1] Microsoft Windows Server 2012 Datacenter [1]	**4 TB**	**1.5 TB**
Red Hat Enterprise Linux 6	**16 GB**	**16 GB**
Red Hat Enterprise Linux 6 (x86_64)	**3 TB**	**1.5 TB**
VMware ESXi 5.0 / 5.1 [2]	**2TB**	**1.5 TB**

[1] The maximum available memory and the maximum virtual memory size per virtual machine when using Hyper-V are below
- Windows Server 2008 Standard: 32 GB (maximum available memory), 31 GB (virtual machine)
- Windows Server 2008 Enterprise : 1 TB (maximum available memory), 64 GB (virtual machine)
- Windows Server 2008 R2 : 1 TB (maximum available memory), 64 GB (virtual machine)
- Windows Server 2012 : 4 TB (maximum available memory), 1 TB (virtual machine)

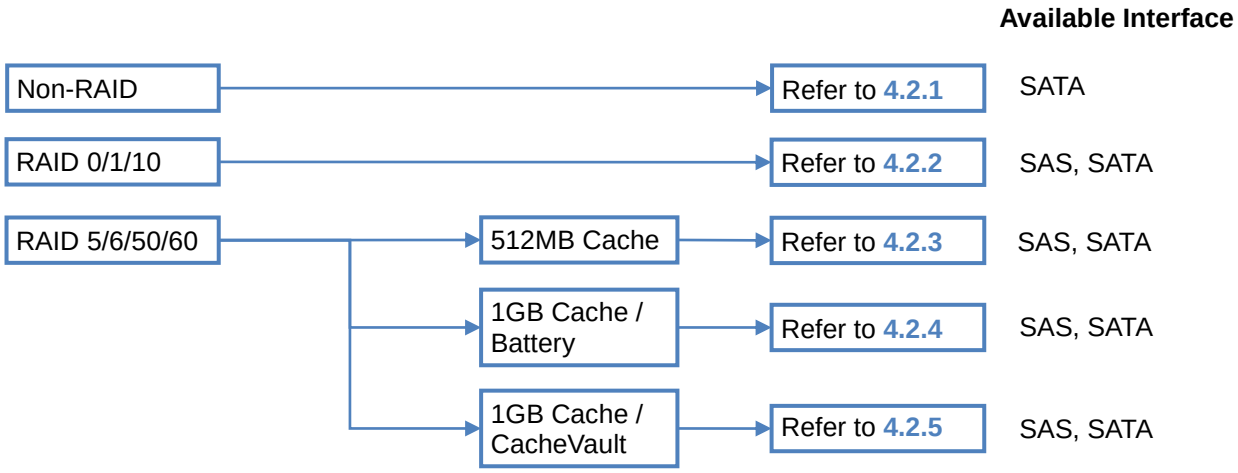
[2] Up to 1TB of main memory is available to each virtual machine.

4 Internal Hard Disk Drives

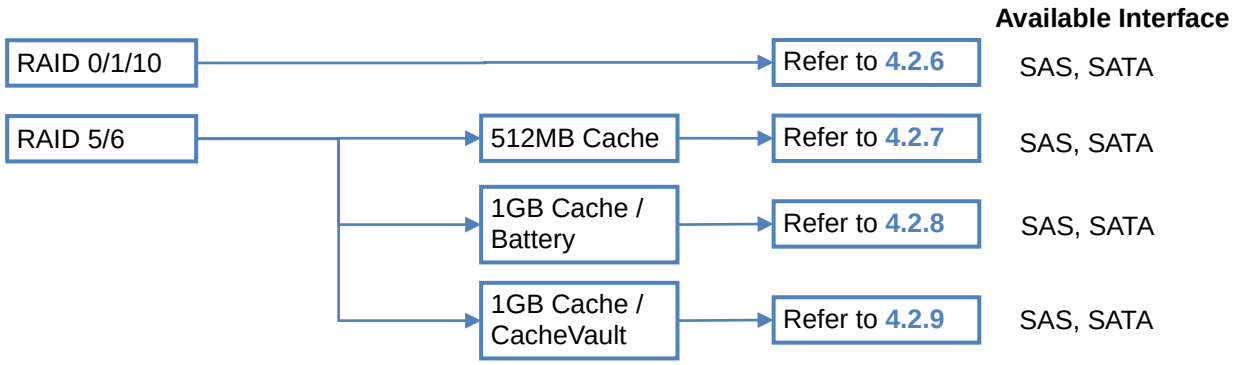
4.1 RAID Configuration

Refer to the section in accordance with your disk form factor and RAID configuration.

Up to eight 2.5-inch Drives



Up to sixteen 2.5-inch Drives



NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Hot plug insertion/removal are not supported in the Embedded SATA configuration.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

4.2 Internal Drive Configuration

4.2.1 Up to four Drives with Embedded SATA Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 4 x SATA ports	(Standard)
Cable		**Internal SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch Hot-plug hard drive bays	(Standard)
Drive **4 slots available**	**SATA HDD**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- Hot plug insertion/removal are not supported in the configuration.
- The maximum transfer speed for Slot 2 and Slot 3 is 3 Gb/s.

4.2.2 Up to eight Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
RAID BBU **Recommended**		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Drive **8 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed.

4.2.3 Up to eight Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-173
RAID BBU **Recommended**		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Drive **8 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.2.4 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
RAID BBU **Recommended**		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching **Recommended**		**MegaRAID CacheCade** for LSI MegaRAID SAS **NOTE:** - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Drive **8 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.2.5 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cahce, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-168
SSD Caching **Recommended**		**MegaRAID CacheCade** for LSI MegaRAID SAS **NOTE:** - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable **Required**		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Drive **8 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.2.6 Up to sixteen Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
RAID BBU **Recommended**		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 6 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage **Required**		**2.5-Inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x mini-SAS to 1 x mini-SAS cable, SAS expander card	N8154-68
Drive **16 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.2.7 Up to sixteen Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-173
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 6 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x mini-SAS to 1 x mini-SAS cable, SAS expander card	N8154-68
Drive 16 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

4.2.8 Up to sixteen Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS **NOTE:** - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS,6 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x mini-SAS to 1 x mini-SAS cable, SAS expander card	N8154-68
Drive 16 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SASHDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

4.2.9 Up to sixteen Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-168
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS,6 sets	(Standard)
Drive Cage		**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required		**2.5-Inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x mini-SAS to 1 x mini-SAS cable, SAS expander card	N8154-68
Drive 16 slots available	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		1.2TB HDD 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs and SAS SSDs can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal 1 slot available	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-100
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software DVD Read speed: 8x (DVD-R / DVD-RW / DVD-R DL / DVD+R / DVD+RW / DVD+R DL / DVD-ROM) DVD-RAM read speed: 5x CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-107F
External	**External DVD-ROM drive** DVD-ROM drive, Bus powered, 1.2 A required DVD Read speed: 4x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 12x (CD-ROM / CD-R/RW)	N8160-91

NOTE:

- Up to 1 optical drive can be connected.

6 Internal Tape / RDX Drives

6.1 Tape / RDX Drive Selection

Refer to the section in accordance with your type of tape drives:

- DAT: Refer to 6.2.1
- RDX: Refer to 6.2.2

NOTE:

- Tape devices cannot be directly connected to VMware systems. For VMware systems, it is recommended to connect and configure an additional backup server via network.

6.2 Tape / RDX Configuration

6.2.1 DAT

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port	(Standard)
Cable	**Internal USB cable** 1 x Internal USB to 1 x USB device	(Standard)
Drive 1 bay available	**Internal DAT (USB)** DDS4 / DAT72 / DAT160, Native capacity 80 GB **NOTE**: DDS1 / DDS2 / DDS3 format are not supported	N8151-78A

6.2.2 RDX

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port	(Standard)
Cable	**Internal USB cable** 1 x Internal USB to 1 x USB device	K410-264(00)
Drive 1 bay available	**Internal RDX (USB)**	N8151-105

7 PCI Riser Card / PCI Card

Please refer to **Supported PCI Cards and Installable Slots** with regard to the position of PCI slot which can mount PCI card supported.

7.1 PCI Riser Card

Product Name / Description	Part Number
PCIe Riser Card Kit 2 x PCIe 3.0 x8	(Standard)
PCIe x16 Riser Card Kit 1 x PCIe 3.0 x16	N8116-25
PCI-X Riser Card Kit 1 x 64-bit/133 MHz PCI-X, 1x PCIe 3.0 x8	N8116-26
PCI Riser Card Kit 2x 64-bit/33 MHz PCI (5V) **NOTE:** The riser card is make-to-order product. Please consult our sales representative in regard to production lead time. The card is not supported on VMware ESXi systems.	N8116-27

7.2 Full Length PCI Card installation Kit

For a full-length PCI card (D=312mm/12.28 in) installation in PCI Slot #1B

Product Name / Description	Part Number
Full Length PCI Card installation Kit For a full-length installation, contains special heat sinks	N8116-28

NOTE:

- Obtain the graphics card installation kit in addition to this product when to install graphics board.
- Since this product is make-to-order manufacturing, the support is provided individually. Contact our sales representative for details.

7.3 Network Interface Controller

Category		Product Name / Description	Part Number
Riser	**1GbE**	**Dual Port 1000BASE-T Riser Card** Broadcom® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x8	N8104-135
	10GbE	**Dual Port 10GBASE-T Riser Card** Broadcom® BCM57810 Converged Controller PCIe 2.0 x8 **NOTE**: - Jumbo frame is not supported on and Redhat Enterprise Linux 6 (x86) operating systems.	N8104-136
		Dual Port 10GBASE SFP+ Riser Card Broadcom® BCM57810 Converged Controller PCIe 3.0 x8 **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to two SFP+ Modules can be installed. - Supports up to two adapters of 10Gb Converged Network Adapter and 10Gb Network Adapter on any supported operating systems, excluding Red Hat Enterprise Linux 6(x86), 6.1 and 6.2(x86_64). - Jumbo frame is not supported on and Redhat Enterprise Linux 6 (x86) operating systems.	N8104-137
Adapter	**1GbE**	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-138
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132
		Dual Port 1000BASE-T Adapter Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4, Max. 2	N8104-145
		Quad Port 1000BASE-T Adapter Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4 **NOTE:** - Network cables with RJ-45 plug covers cannot be used.	N8104-133
	10GbE	**10GBASE Adapter (SFP+/2ch)** Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8 **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Supports up to two adapters of 10Gb Converged Network Adapter and 10Gb Network Adapter on any supported operating systems, excluding Red Hat Enterprise Linux 6(x86), 6.1 and 6.2(x86_64).	N8104-128
		Dual Port 10Gb Converged Network Adapter BROCADE 1020 Dual Port 10Gbps Converged Network Adapter PCIe 2.0 x8, 2 x SFP modules, Max. one adapter **NOTE**: - Supports up to two adapters of 10Gb Converged Network Adapter and 10Gb Network Adapter on any supported operating systems, excluding Red Hat Enterprise Linux 6(x86), 6.1 and 6.2(x86_64).	N8104-131

Category	Product Name / Description	Part Number
SPF+ Module	**SFP+ Module (10G-SR)** 1 x SFP+ Module for N8104-128 and N8104-137	N8104-129

NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows Server 2008 supports BASP (Broadcom Advanced Server Program) or Intel PROSet teaming while Windows Server 2012 and Linux support teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
1GbE NIC Embedded 1GbE NIC and N8104-135/-138/-132/-133	Up to four teams per one system Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Red Hat Enterprise Linux
10GbE NIC N8104-128/137	Up to two teams per one system Up to two ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Red Hat Enterprise Linux

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for teaming must be the same.
- When 10GbE and 1GbE NIC teaming are mixed, the teams must be up to four per one system.

Using iSCSI

See the table below for supported network interfaces and operating system combinations.

Category	Network Interface	Operating Systems
1GbE	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-138	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-132	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-133	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
10GbE	N8104-128	Windows Server 2008, Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.4 External Storage Controller

7.4.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9286CV-8e RAID0/1/5/6/10/50/60, 1GB, Ext. 8, PCIe 3.0 x8, SAS 6Gb/s, SATA 6Gb/s, flash cache protection modules included	N8103-161

NOTE:

- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

7.4.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-153
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-154
	Fibre Channel Controller (1ch) Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157
	Fibre Channel Controller (2ch) Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-158
SAS	**SAS Controller** LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8	N8103-142

NOTE:

- Up to two 16Gb/s Fiber Channel Controller can be installed.

7.5 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

NOTE:

- Up to one Serial Port Adapter can be installed.

8 Other Add-in Components

8.1 Power Supply Module

Product Name / Description	Part Number
450W Hot Plug Power Supply 1 x 450 Watt 80 PLUS® Platinum	N8181-86F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum	N8181-87F
1000W Hot Plug Power Supply 1 x 1000 Watt 80 PLUS® Platinum	N8181-88F

NOTE:

- The power units must be the same to configure redundancy.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:
  http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls

8.2 Redundant Fan Kit

Product Name / Description	Part Number
Redundant Fan Kit 5 hot plug redundant cooling fans for R120e-2M	N8181-119

8.3 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-19

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this kit.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

8.4 Internal Flash Memory

Available socket: 1

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDER DVD without DVD media **NOTE:** Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory. The following operations can be performed with the flash memory: - Installation of Windows server with express setup - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools - Installation of NEC ESMPRO Agent and Universal RAID Utility - Performance of the Test and Diagnosis Tool	N8115-07

8.5 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
Flash FDD USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

NOTE:

- Up to one drive can be connected.

8.6 Front Bezel

Product Name / Description	Part Number
Front Bezel Front bezel for R120e-2M	N8146-46F

9 Add-on Components

9.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM	**Drawer**	**17-inch LCD Console Drawer (8port)** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
	Cable	**Switch Unit Connection Cable Set (USB, 1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
Drawer w/o KVM	**Drawer**	**17inch LCD Console Unit 1U** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2 m	N8143-76F
		17inch LCD Console Drawer (1port) 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m	N8143-84F
	Keypad	**Keyboard Unit (JP)** JP 108-keys Keyboard with 10-key for N8143-84F 17inch LCD Console Drawer (1port)	N8143-85
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-84F 17inch LCD Console Drawer (1port)	N8143-87

9.2 KVM Switch

Category		Product Name / Description	Part Number
KVM Switch		**Server Switch Unit (8 server)** 1U USB 8 port KVM switch	N8191-12F
Cable	**KVM**	**Switch Unit Connection Cable Set (USB,1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
	Cascading	**Switch Unit Connection Cable 1.8 m** 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	K410-119(1A)

9.3 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 2U Kit For R120e-2M	N8143-95

9.4 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. **NOTE:** Remote KVM and remote media features are not available for virtual machines.	N8115-04

9.5 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
RDX	**RDX Cartridge (320GB)**	N8151-105	N8153-01
	RDX Cartridge (500GB)	N8151-105	N8153-02
	RDX Cartridge (1TB)	N8151-105	N8153-03
	RDX Cartridge (1.5TB)	N8151-105	N8153-04

References

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/standard LAN/fan/degeneration (memory/hard drive)	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	Booting, BIOS/POST stall, OS stall, shutdown	✓[1]	✓[1]
Alerting	HW error, Boot error and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, DOS utility	✓[2]	✓
	Panic screen, Boot screen	✓[2, 3, 4]	✓
	Text-based screen (OS console)	✓[2, 4]	✓
	GUI-based screen (OS console)	-	✓
	Remote console recording	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	OS shutdown	✓[1]	✓[1]
	Remote media (CD/DVD/FD)	-	✓
	Server Management Command Line Protocol (DMTF compliant)	✓	✓
	Remote control via Web browser (without dedicated app)	✓	✓
	Remote batch	✓	✓
	Scheduling (without UPS)	✓[1]	✓[1]
Others	Set automatic IP address via DNS/DHCP	✓	✓
Remote wakeup	Wake On LAN, Wake On Ring	✓	✓
Centralized management	Monitoring and control of multiple servers	✓	✓
Industry standard	IPMI	2.0	2.0

1 The feature is not supported on VMware ESXi systems.

2 The optional serial port is not available for the feature.

3 Monitoring boot screens is not supported on VMware systems.

4 In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2012	WS 2008R2	WS 2008	WS 2008 x64	RHEL 6	RHEL 6 x64	ESXi 5.1	ESXi 5.0
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓
N8190-157	Fibre Channel Controller	✓	✓	-	-	-	✓	-	-
N8190-158	Fibre Channel Controller (2ch)	✓	✓	-	-	-	✓	-	-
N8104-135	Dual Port 1000BASE-T Riser Card	✓	✓	✓	✓	✓	✓	✓	✓
N8104-138	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓
N8104-136	Dual Port 10GBASE-T Riser Card	✓	✓	✓	✓	✓	✓	✓	✓
N8104-137	Dual Port 10GBASE SFP+ Riser Card	✓	✓	✓	✓	✓	✓	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓
N8104-131	Dual Port 10Gb Converged Network Adapter	-	✓	✓	✓	✓	✓	-	-

Supported PCI Cards and Installable Slots

Standard Riser Card

Part Number	Product Name	Slots						
		#1A	#1B	#2B	#1C	#2C	#3C [1]	#1D
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-	-	-	-	-
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	-	-	✓ [3]	✓ [3]	-
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	✓	-	✓	✓	-
N8103-142	SAS Controller	-	✓	✓	✓	✓	✓	-
N8190-153	Fibre Channel Controller	-	✓	✓	-	✓	✓	-
N8190-154	Fibre Channel Controller (2ch)	-	✓	✓	-	-	✓	-
N8190-157	Fibre Channel Controller	-	✓	✓	-	✓	✓	-
N8190-158	Fibre Channel Controller (2ch)	-	✓	✓	-	-	✓	-
N8104-135	Dual Port 1000BASE-T Riser Card	-	-	-	-	-	-	✓
N8104-138	1000BASE-T adapter	-	✓	✓	✓	✓	✓	-
N8104-132	Dual Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	-
N8104-145	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-
N8104-133	Quad Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	-
N8104-136	Dual Port 10GBASE-T Riser Card	-	-	-	-	-	-	✓
N8104-137	Dual Port 10GBASE SFP+ Riser Card	-	-	-	-	-	-	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	✓	✓	-	-	✓	-
N8104-131	Dual Port 10Gb Converged Network Adapter	-	✓	✓	-	-	✓	-
N8117-01A	Serial Port Adapter	-	-	-	✓	✓	✓	-

[1] #3C slot is available in dual-processor configuration

[2] To install a PCI card for more than 220 mm (8.66 in), N8116-28 full-length PCI installation kit is required.

[3] Not available in up to sixteen drives configuration

N8116-25 PCIe x16 Riser Card Kit

		Slots					
Part Number	**Product Name**	**#1A**	**#1B**	**#1C**	**#2C**	**#3C** [1]	**#1D**
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-	-	-	-
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-	-	-	-
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	-	-	-	✓ [3]	✓ [3]	-
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	-	✓	✓	-
N8103-142	SAS Controller	-	-	✓	✓	✓	-
N8190-153	Fibre Channel Controller	-	-	-	✓	✓	-
N8190-154	Fibre Channel Controller (2ch)	-	-	-	-	✓	-
N8190-157	Fibre Channel Controller	-	-	-	✓	✓	-
N8190-158	Fibre Channel Controller (2ch)	-	-	-	-	✓	-
N8104-135	Dual Port 1000BASE-T Riser Card	-	-	-	-	-	✓
N8104-138	1000BASE-T adapter	-	-	✓	✓	✓	-
N8104-132	Dual Port 1000BASE-T Adapter	-	-	✓	✓	✓	-
N8104-145	Dual Port 1000BASE-T Adapter	-	-	✓	✓	✓	-
N8104-133	Quad Port 1000BASE-T Adapter	-	-	✓	✓	✓	-
N8104-136	Dual Port 10GBASE-T Riser Card	-	-	-	-	-	✓
N8104-137	Dual Port 10GBASE SFP+ Riser Card	-	-	-	-	-	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	-	-	-	✓	-
N8104-131	Dual Port 10Gb Converged Network Adapter	-	-	-	-	✓	-
N8117-01A	Serial Port Adapter	-	-	✓	✓	✓	-

[1] Available in dual-processor configuration

[2] To install a PCI card for more than 220 mm (8.66 in), N8116-28 full-length PCI installation kit is required.

[3] Not available in up to sixteen drives configuration

N8116-26 PCI-X Riser Card Kit

		Slots						
Part Number	**Product Name**	**#1A**	**#1B**	**#2B**	**#1C**	**#2C**	**#3C** [1]	**#1D**
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-	-	-	-	-
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	-	-	✓ [3]	✓ [3]	-
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	-	-	✓	✓	-
N8103-142	SAS Controller	-	✓	-	✓	✓	✓	-
N8190-153	Fibre Channel Controller	-	✓	-	-	✓	✓	-
N8190-154	Fibre Channel Controller (2ch)	-	✓	-	-	-	✓	-
N8190-157	Fibre Channel Controller	-	✓	-	-	✓	✓	-
N8190-158	Fibre Channel Controller (2ch)	-	✓	-	-	-	✓	-
N8104-135	Dual Port 1000BASE-T Riser Card	-	-	-	-	-	-	✓
N8104-138	1000BASE-T adapter	-	✓	-	✓	✓	✓	-
N8104-132	Dual Port 1000BASE-T Adapter	-	✓	-	✓	✓	✓	-
N8104-145	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-
N8104-133	Quad Port 1000BASE-T Adapter	-	✓	-	✓	✓	✓	-
N8104-136	Dual Port 10GBASE-T Riser Card	-	-	-	-	-	-	✓
N8104-137	Dual Port 10GBASE SFP+ Riser Card	-	-	-	-	-	-	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	✓	-	-	-	✓	-
N8104-131	Dual Port 10Gb Converged Network Adapter	-	✓	-	-	-	✓	-
N8117-01A	Serial Port Adapter	-	-	-	✓	✓	✓	-

[1] Available in dual-processor configuration

[2] To install a PCI card for more than 220 mm (8.66 in), N8116-28 full-length PCI installation kit is required.

[3] Not available in up to sixteen drives configuration

N8116-27 64-bit PCI Riser Card Kit

		Slots						
Part Number	**Product Name**	**#1A**	**#1B**	**#2B**	**#1C**	**#2C**	**#3C** [1]	**#1D**
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-	-	-	-	-
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-	-
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	-	-	-	-	✓ [3]	✓ [3]	-
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	-	-	-	✓	✓	-
N8103-142	SAS Controller	-	-	-	✓	✓	✓	-
N8190-153	Fibre Channel Controller	-	-	-	-	✓	✓	-
N8190-154	Fibre Channel Controller (2ch)	-	-	-	-	-	✓	-
N8190-157	Fibre Channel Controller	-	-	-	-	✓	✓	-
N8190-158	Fibre Channel Controller (2ch)	-	-	-	-	-	✓	-
N8104-135	Dual Port 1000BASE-T Riser Card	-	-	-	-	-	-	✓
N8104-138	1000BASE-T adapter	-	-	-	✓	✓	✓	-
N8104-132	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-
N8104-145	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-
N8104-133	Quad Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-
N8104-136	Dual Port 10GBASE-T Riser Card	-	-	-	-	-	-	✓
N8104-137	Dual Port 10GBASE SFP+ Riser Card	-	-	-	-	-	-	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	-	-	-	-	✓	-
N8104-131	Dual Port 10Gb Converged Network Adapter	-	-	-	-	-	✓	-
N8117-01A	Serial Port Adapter	-	-	-	✓	✓	✓	-

[1] Available in dual-processor configuration

[2] To install a PCI card for more than 220 mm (8.66 in), N8116-28 full-length PCI installation kit is required.

[3] Not available in up to sixteen drives configuration

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

Revision History

Revision	Date	Description
1.0	September 13, 2013	Initial release